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WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada



U. S. DEPARTMENT of AGRICULTURE ★ SOIL CONSERVATION SERVICE

Collaborating with
CALIFORNIA DEPARTMENT of WATER RESOURCES
and
BRITISH COLUMBIA DEPARTMENT of
LANDS, FORESTS and WATER RESOURCES

AS OF
FEB. 1, 1977

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1900 snow courses in Western United States and in the Columbia Basin in British Columbia. Networks of automatic snow water equivalent and related data sensing devices, along with radio telemetry are expanding and will provide a continuous record of snow water and other parameters at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

COVER PHOTO: SNOW COURSE MEASUREMENTS BY A SURVEY TEAM IN UTAH'S WASATCH RANGE.
ORC-254-10

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, West Technical Service Center, Room 510, 511 N.W. Broadway, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	Room 129, 2221 East Northern Lights Blvd., Anchorage, Alaska 99504
Arizona	Room 3008, 6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	P. O. Box 17107, Denver, Colorado 80217
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1220 S.W. Third Ave., Portland, Oregon 97204
Utah	4012 Federal Bldg., 125 South State St., Salt Lake City, Utah 84138
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 2440, Casper, Wyoming 82602

PUBLISHED BY OTHER AGENCIES

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia



WATER SUPPLY OUTLOOK FOR WESTERN UNITED STATES

Including Columbia River Drainage in Canada

ISSUED

FEBRUARY 1, 1977

The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Corps of Engineers, Forest Service, National Park Service, NOAA, National Weather Service, Geological Survey, and other Federal Agencies, Departments of State Government, Irrigation Districts, Power Companies, and others.

The Department of Water Resources coordinates snow surveys in California.

The Water Resources Service, Department of Lands, Forests, and Water Resources directs snow surveys in British Columbia.

This report was prepared by the Water Supply Forecasting Unit, Engineering Division, Soil Conservation Service, from data supplied by Snow Survey Supervisors of the Soil Conservation Service in the States of Alaska, Arizona, Colorado and New Mexico, Idaho, Montana, Nevada, Oregon, Utah, Washington, and Wyoming.

Data from California was supplied by the Chief, Water Supply Forecast and Snow Survey Unit, Department of Water Resources.

Data from British Columbia was supplied by the Chief, Hydrology Division, Water Investigations Branch, Department of Lands, Forests and Water Resources.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
R.M. DAVIS, ADMINISTRATOR

WATER SUPPLY OUTLOOK

1977 SNOWMELT SEASON
FEBRUARY 1, 1977

THE WATER SUPPLY OUTLOOK OVER VIRTUALLY THE ENTIRE WEST IS VERY POOR. EXTREMELY DRY WEATHER THROUGHOUT THE FALL AND EARLY WINTER HAS RESULTED IN RECORD LOW SNOWPACK OVER MOST OF THE WESTERN STATES. IF THE DRY WEATHER PERSISTS FOR THE REST OF THE WINTER, MOST RIVERS WILL YIELD ALL-TIME LOW QUANTITIES THIS SPRING.

Snowpack conditions are extremely poor over most of the western United States. Many data sites now have less accumulated snow than at any time since the measurement program began. In Wyoming, 58 year old records have been broken, and most other state's snowpacks are the lowest in data histories of at least 40 years.

The dry weather pattern began over most of the region early last fall. Only a few substantial storms have covered the areas since that time. As of February 1 about two-thirds of the West's snowfall would have been received during a normal year. The only area of the West which has a normal snow cover is that portion of the Big Horn Range in Wyoming and the Black Hills of South Dakota and Wyoming. This region has received numerous snowfalls from the westerly edge of the series of storms which have hit the Midwest.

Although nearly all rivers and streams in the West are forecast to yield near-record minimum quantities, the water supply outlook in California and Nevada is most bleak. The Sierra Nevada range had a very light snowpack last year. Consequently, demands on reservoir supplies were heavier than usual. A second consecutive year of record breaking low snowpack together with severely depleted reservoir supplies indicates that water users on both sides of the Sierra face critical shortages. Intensive water management and conservation practices will be required to ease the impact of these forecast shortages.

The British Columbia Department of Lands, Forests, and Water Resources reports that the snowpack on the Upper Columbia River in Canada is only about one-half of the normal accumulation. Streamflow during the spring and summer season in the Columbia is forecast to be very near the lowest amount recorded in the past 100 years. The contribution from the Snake River system is forecast to be only about 50 percent of its normal.

The Upper Missouri River Basin is forecast to yield only forty to fifty percent of average. Reservoir storage is normal to slightly above the average February 1 levels, which will help alleviate the expected short supplies in this basin.

The Platte and Arkansas drainages are also forecast to discharge only about one-half of their usual amounts. Reservoirs are expected to provide near normal supplements along both the North and South Platte Rivers. However, the Arkansas reservoir storage is poor, and is not expected to provide the needed relief.

Only forty to fifty percent of normal spring and summer runoff is anticipated from most streams in the Colorado River Basin as well as the Great Basin. Some local watersheds in New Mexico and Arizona, such as the Rio Chama and Verde, received much needed snowfall early in January. These streams are expected to yield up to three-fourths of their usual amounts.

ALASKA

Snow surveys just completed verifying this winter as being most abnormal. While southern valleys and coastlines have "bared-up" under cloudy skies and warm temperatures, the same cloudy skies have been dumping tremendous amounts of snow and rain in the coastal mountain ranges.

The high elevation snow courses on the Kenai Peninsula, and Chugach Range are maximum of record for February 1, and many are close to 200 percent of normal. Moving north from the coastal ranges, the snowpack is significantly reduced percentage-wise. However, the lower Susitna Valley and mountainous regions as far north as the Alaska range still have a well above normal snowpack. The Upper Susitna and Copper River basins are a little above normal overall.

Alaska's interior snowpack was raised substantially by the January ending storm. Prior to that the Chena Basin was about as dry as 1970, but is now considerably ahead of last year and only about 25% below normal. Snow courses along the pipeline north of the Yukon Crossing report conditions slightly above normal for February 1.

Unseasonably warm temperatures and considerable rainfall have caused the heavy snowpack along the Gulf of Alaska to more closely resemble mid-May melt conditions. The snowpack at Turnagain Pass, along the Seward Highway, was five feet of slush. This is indicative of an early and heavy runoff.

ARIZONA

Snowfall has been very light in most of Arizona this year. The only good storms of the season, occurring in early January did, however, leave modest amounts of snow in some areas. The last two weeks of warm weather has reduced the snow cover at the lower elevations considerably, but the few light storms have increased the high elevation snow slightly. Snow cover is particularly low at the higher elevations of the San Francisco Peaks and the White Mountains while relatively heavy snow exists in a narrow band from Mormon Lake to McNary.

SUMMARY OF SNOW WATER EQUIVALENT MEASUREMENTS FEBRUARY 1, 1977

MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:		MAJOR BASIN AND SUB - WATERSHED	WATER EQUIVALENT IN PERCENT OF:	
	LAST YEAR	AVERAGE		LAST YEAR	AVERAGE
MISSOURI BASIN			SNAKE BASIN		
Jefferson	28	32	SNAKE above Jackson, Wyo.	24	32
Madison	28	32	SNAKE above Hiese, Idaho	31	37
Gallatin	43	50	Henry's Fork	24	26
Missouri Main Stem	49	57	Southern Idaho Tributaries	13	13
Yellowstone	33	42	Big and Little Wood	20	15
Shoshone	39	52	Boise	11	10
Wind	21	26	Owyhee	13	11
North Platte	47	47	Payette	17	15
South Platte	46	40	Malheur	12	13
ARKANSAS BASIN			Weiser	11	9
Arkansas	37	35	Burnt	13	14
Cucharas - Purgatoire	80	75	Powder	13	12
RIO GRANDE BASIN			Salmon	17	16
Rio Grande (Colo.)	26	25	Grande Ronde	14	15
Rio Grande (New Mexico)	86	75	Clearwater	28	32
Pecos	93	112	LOWER COLUMBIA BASIN		
COLORADO BASIN			Yakima	12	4
Green (Wyo.)	34	35	Umatilla	19	26
Yampa - White	52	41	John Day	14	14
Duchesne	27	19	Deschutes - Crooked	14	14
Price	16	16	Hood	16	11
Upper Colorado	43	40	Willamette	11	11
Gunnison	39	32	Lewis	10	6
San Juan	45	31	Cowlitz	10	9
Dolores	31	27	PACIFIC COASTAL BASIN		
Virgin	86	37	Puget Sound	12	14
Gila	87	46	Olympic Peninsula	0	0
Salt	80	62	Umpqua - Rogue	15	19
Verde	101	95	Klamath	16	16
GREAT BASIN			Trinity	45	20
Bear	25	22	CALIFORNIA		
Logan	21	19	CENTRAL VALLEY		
Ogden	20	19	Upper Sacramento	55	20
Weber	22	24	Feather	150	30
Provo - Utah Lake	30	29	Yuba	80	20
Jordan	24	25	American	85	25
Sevier	57	36	Mokelumne	125	25
Walker - Carson	91	18	Stanislaus	100	20
Tahoe - Truckee	95	25	Tuolumne	100	20
Humboldt	27	26	Merced	135	20
Lake Co. (Oregon)	26	19	San Joaquin	135	20
Harney Basin (Oregon)	19	19	Kings	165	25
Owens	250	25	Kaweah	165	25
UPPER COLUMBIA BASIN			Tule	800	40
Columbia (Canada)	49	54	Kern	600	30
Kootenai	32	27	<i>Data for California Watersheds supplied by Dept. of Water Resources, and for British Columbia Watersheds by Dept. of Lands, Forests and Water Resources.</i>		
Clark Fork	35	39			
Bitterroot	30	36	<i>Average is for 1958-72 period. California averages are for the period 1931-70. Based on Selected Snow Courses determined by Distri- bution within the Basin. Length of Record and Repetitive Monthly Measurement Schedules.</i>		
Flathead	41	35			
Spokane	35	29			
Okanogan	31	33			
Methow	15	15			
Chelan	4	16			
Wenatchee	12	12			

Snow cover varies from 42% of average on the Gila Watershed to 95% on the Verde, with conditions on the Salt and Little Colorado Watersheds 61 and 49% of average respectively.

Although watershed precipitation has been much above normal during January, the accumulated amount since November 1 is only 50 to 60% of average. January amounts of 3 to 4" were common at the higher elevations and 1 to 2" elsewhere. Only Greer received less than one inch.

Soil moisture is generally below average, but the recent melting snow has greatly improved the surface soil moisture. A good storm in the next few weeks should yield good runoff from the lower elevations. At the higher elevations, where there has been little or no melt, soils are dry.

Water storage in Arizona varies greatly. San Carlos Reservoir is nearly empty, while Lyman Reservoir contains 20% above average for this date. The Salt River Project reservoirs are slightly less than half full, which is near normal. Lake Pleasant contains about half of average, while the Colorado River reservoirs are 57% above average.

Runoff from the early January storms has not been significant as dry soils absorbed the water from the slowly melting snow. Streamflow forecasts (January through May) range from about 30% of average on the Gila to 65% on the Verde.

Water supplies will be adequate in most of Arizona this year if reasonable conservation is practiced. The San Carlos Project, however, has a virtually empty reservoir, and inflow is expected to be only 1/4 of average. Water supplies will also be short in the Safford Valley where heavy pumping will be required.

CALIFORNIA

The California Department of Water Resources, coordinating agency for snow surveys and water supply forecasting in California, reports that the continuing statewide drought, now in its second year, is touching the lives of nearly all Californians. The first statewide snow surveys for the 1977 season report a layer of snow less than 2 feet in depth with less than 6 inches of water content. Resultant forecasts of spring runoffs indicate new record low flows may be established. Reservoir storage is also low because of large portion of stored carryover water from 1975 was used to meet requirements through the summer of 1976. This combination of forecasted deficient future inflows and the present far below average reservoir storage warns that the drought will intensify unless the state receives very heavy amounts of precipitation in the next few months.

Forecasts of runoff for the April through July period are only 35 to 40 percent of normal in most river basins of the state. The forecasted inflow to Shasta Lake is the highest in the state with 62 percent of average inflows anticipated for the period.

Snowpack is far below average. Only one storm during the months of October through January produced significant snowfall. As a result, the accumulated snowpack on February 1 is only 25 percent of average for this date. This equates to only 15 percent of the maximum seasonal accumulation which usually occurs by April 1. Normally, 65 percent of the winter's pack has been deposited by February 1, so to regain the average April 1 snow water storage this year, snowfall over the next two months must be 240 percent greater than normally received.

Precipitation since October 1 has been about 35 percent of normal over the state, a record low. The most severe deficiency was in the northern one-third of the state where only about 20 percent of normal precipitation has been received during the four-month period.

Reservoir storage on February 1 is 60 percent of average for the state. In the Central Valley, storage is now 55 percent of average or about 7.5 million acre feet below normal storage for February 1. Present storage in the 78 Central Valley reservoirs used for reporting purposes now stands at 9.6 million acre feet, a drop of 6.5 million acre feet from last year on this date. On the Colorado River, combined storage in Lakes Powell, Meade, Mohave, and Havasu is now 130 percent of average.

COLORADO

The snowpack is very low throughout the mountainous areas of Colorado except for the Sangre de Cristo range. Statewide surveys indicate the snowpack is but 25 to 50 percent of the usual amount. This is one of the lightest snowpacks measured on February 1 since the snow survey program began in 1935. On the South Platte the accumulated snowpack is only 40 percent of normal, while the Arkansas has 35 percent of average. Some local drainages in the Sangre de Cristo have as much as 75 percent of their expected February 1 levels.

Soil moisture conditions are dry in the mountainous areas of the state, and also are depleted in the agricultural areas by prolonged dry weather.

Reservoir storage is near average in most systems except the Arkansas which currently holds only a fraction of its capacity.

Water supplies during the coming summer are expected to be short, and may be critically low if the drought continues for the balance of the snow accumulation season. The Cache de Poudre is forecast to yield only 61 percent of average, and similar flows are expected from other front range streams. The Colorado will flow at about one-half its norm, as will the Gunnison River. Some Sange de Cristo streams will discharge as much as 70 percent of their average quantities.

Water users dependent on direct diversion are facing the probability of shortages. However, those users who receive some water from reservoirs can expect that their shortage deliveries will be near normal.

SELECTED STREAMFLOW FORECASTS FEBRUARY 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
SASKATCHEWAN				
St. Mary near Babb, Montana <u>1/</u>	320	65	Apr-Sep	-
UPPER MISSOURI				
Beaverhead near Grant, Montana <u>2/</u>	42	30	Apr-Sep	244
Big Hole near Melrose, Montana	295	39	Apr-Sep	-
Madison near Grayling, Montana <u>3/</u>	335	70	Apr-Sep	575
Gallatin near Gateway, Montana	310	58	Apr-Sep	-
Sun at Gibson Dam, Montana <u>4/</u>	345	58	Apr-Sep	703
Belt near Monarch, Montana	72	58	Apr-Sep	-
Marias near Shelby, Montana <u>5/</u>	180	32	Apr-Sep	-
Missouri near Landusky, Montana <u>6/</u>	1,950	41	Apr-Sep	-
near Williston, North Dakota <u>7/</u>	-	-	Apr-Sep	-
S. Fk. Musselshell above Martinsdale, Montana	35	70	Apr-Sep	-
Milk at Eastern Crossing, Montana	250	87	Mar-Sep	-
Yellowstone at Yellowstone Lake Outlet, Wyo.	460	56	Apr-Oct	955
at Corwin Springs, Montana	1,240	62	Apr-Sep	2,453
at Miles City, Montana <u>8/</u>	-	-	Apr-Sep	-
Clarks Fork near Belfry, Montana	385	63	Apr-Sep	-
Shoshone below Buffalo Bill Res., Wyo. <u>9/</u>	500	60	Apr-Sep	1,037
Wind near Dubois, Wyoming	65	64	Apr-Sep	146
at Riverton, Wyoming <u>10/</u>	380	57	Apr-Sep	-
below Boysen Res., Wyoming <u>11/</u>	600	60	Apr-Sep	1,100
Bull Lake Creek near Lenore, Wyoming	124	68	Apr-Sep	178
Little Popo Agie near Lander, Wyoming	34	71	Apr-Sep	-
Tensleep near Tensleep, Wyoming	44	56	Apr-Sep	-
Medicine Lodge near Hyattsville, Wyoming	10	49	Apr-Sep	-
Shell Creek near Shell, Wyoming	55	75	Apr-Sep	-
Big Horn near St. Xavier <u>8/</u>	-	-	Apr-Sep	-
Tongue near Dayton, Wyoming	115	102	Apr-Sep	108
No. Fork Powder near Hazelton, Wyoming	8	80	Apr-Sep	11
PLATTE				
North Platte nr Northgate, Colorado	125	52	Apr-Sep	163
Encampment near Encampment, Wyoming	70	50	Apr-Sep	143
Laramie & Pioneer Canal, nr Woods, Wyo. <u>12/</u>	65	51	Apr-Sep	-
Big Thompson at Drake, Colorado <u>13/</u>	64	60	Apr-Sep	-
Clear at Golden, Colorado <u>14/</u>	70	55	Apr-Sep	-
St. Vrain at Lyons, Colorado <u>15/</u>	44	59	Apr-Sep	-
Cache LaPoudre near Fort Collins, Colorado <u>16/</u>	150	61	Apr-Sep	-
ARKANSAS				
Arkansas at Salida, Colorado <u>17/</u>	165	53	Apr-Sep	-
Cucharas near LaVeta, Colorado	7	70	Apr-Sep	-
Purgatoire at Trinidad, Colorado	23	61	Apr-Sep	-
RIO GRANDE				
Rio Grande near Del Norte, Colorado <u>18/</u>	275	59	Apr-Sep	-
at Otowi Bridge, New Mexico <u>19/</u>	235	45	Mar-July	-
Conejos near Mogote, Colorado <u>20/</u>	100	54	Apr-Sep	-
El Vado Res., Inflow, New Mexico	90	47	Mar-July	-
Pecos at Pecos, New Mexico	34	83	Mar-July	-
UPPER COLORADO				
Colorado, Grandby Res., Inflow, Colorado <u>21/</u>	135	60	Apr-Sep	-
near Dotsero, Colorado <u>22/</u>	690	48	Apr-Sep	-
near Cameo, Colorado <u>23/</u>	1,185	50	Apr-Sep	-
near Cisco, Utah <u>24/</u>	1,673	59	Apr-July	2,029
Lake Powell Inflow, Arizona <u>25/</u>	2,900	42	Apr-July	5,395
Roaring Fork at Glenwood Springs, Colorado <u>26/</u>	400	56	Apr-Sep	-
Uncompahgre at Colona, Colorado	64	48	Apr-Sep	-
Gunnison, Blue Mesa Res., Inflow, Colorado <u>27/</u>	400	51	Apr-Sep	-

Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS FEBRUARY 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLORADO (continued)				
Gunnison, near Grand Junction, Colorado 28/	550	46	Apr-Sep	-
Dolores at Dolores, Colorado	115	50	Apr-Sep	-
Green at Warren Bridge, Wyoming	195	60	Apr-Sep	347
at Green River, Wyoming 29/	400	40	Apr-Sep	1,222
Flaming Gorge Res., Inflow, Utah 27/	400	34	Apr-July	1,329
at Green River, Utah 30/	981	35	Apr-July	2,251
Big Sandy near Big Sandy, Wyoming	42	74	Apr-Sep	62
Yampa at Steamboat Springs, Colorado	130	47	Apr-Sep	-
near Maybell, Colorado	450	50	Apr-Sep	-
Little Snake near Dixon, Wyoming	125	42	Apr-Sep	254
White near Meeker, Colorado	165	56	Apr-Sep	-
Strawberry at Duchesne, Utah 40/	10	18	Apr-July	-
Duchesne near Tabiona, Utah 31/	35	34	Apr-July	-
at Randlett, Utah 40/	15	5	Apr-July	-
Lakefork below Moon Lake, Utah 32/	28	41	Apr-July	-
Uinta near Neola, Utah	36	41	Apr-July	59
Whiterocks nears Whiterocks, Utah	22	37	Apr-July	47
Price, Scofield Res., Inflow, Utah 33/	10	28	Apr-July	-
Cottonwood near Orangeville, Utah 34/	10	43	Apr-July	-
San Juan, Navajo Res. Inflow, New Mexico 27/	300	50	Apr-July	-
near Bluff, Utah 35/	380	45	Apr-July	634
Animas at Durango, Colorado	235	56	Apr-Sep	-
LOWER COLORADO				
Virgin near Virgin, Utah	19	40	Apr-June	23
Little Colorado above Lyman, Arizona	2	18	Jan-June	18
Gila near Solomon, Arizona	41	31	Jan-May	94
Frisco at Clifton, Arizona	23	30	Jan-May	41
Salt at Intake, Arizona	133	41	Jan-May	240
Tonto above Roosevelt, Arizona	13	28	Jan-May	74
Verde above Horeshoe Dam, Arizona	124	65	Jan-May	307
GREAT BASIN				
Bear at Utah-Wyo. State Line	50	45	Apr-July	80
at Harer, Idaho	82	12	Apr-Sep	-
Smith's Fork near Border, Wyoming	40	34	Apr-Sep	135
Thomas Fork near Wyo.-Ida. State Line	6	19	Apr-Sep	40
Logan near Logan, Utah 36/	45	40	Apr-July	114
Ogden, Pine View Res. Inflow, Utah 27/	20	18	Apr-June	93
Weber near Oakley, Utah	41	41	Apr-June	90
Provo near Hailstone, Utah 37/	26	25	Apr-June	107
Strawberry Res. Inflow, Utah	8	18	Apr-June	38
Utah Lake Net Inflow, Utah	80	39	Apr-July	-
Big Cottonwood near Salt Lake City, Utah	17	49	Apr-July	-
Beaver near Beaver, Utah	7	36	Apr-July	9
Sevier near Hatch, Utah	16	34	Apr-July	25
near Gunnison, Utah	13	33	Apr-July	22
So. Fork Humboldt near Elko, Nevada	-	-	-	-
Humboldt at Palisades, Nevada	40	21	Apr-July	105
Truckee at Farad, California 38/	-	-	-	-
East Carson near Gardnerville, Nevada	-	-	-	-
West Walker near Coleville, California	45	31	Apr-July	50
Donner and Blitzen near Frenchglen, Oregon	28	52	Apr-Sep	-
Silvies near Burns, Oregon	16	22	Apr-Sep	-
Chewaucan near Paisley, Oregon	23	27	Mar-July	67
Deep above Adel, Oregon	23	29	Mar-July	-
Bidwell near Ft. Bidwell, California	-	-	-	-
Owens below Long Valley Res., California	-	-	-	-
West Carson at Woodsfords, California	-	-	-	-
East Walker near Bridgeport, California 39/	-	-	-	-

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SELECTED STREAMFLOW FORECASTS FEBRUARY 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A.F.)
	Flow In (1,000 A.F.)	Percent of Average		
UPPER COLUMBIA				
Columbia at Birchbank, British Columbia 40/	33,900	73	Apr-Sep	53,937
at Grand Coulee, Washington 40/	44,200	64	Apr-Sep	80,974
below Rock Island, Washington	47,500	63	Apr-Sep	86,849
Kootenai near Libby, Montana	4,750	64	Apr-Sep	8,012
at Leonia, Idaho	5,400	60	Apr-Sep	-
Blackfoot near Bonner, Montana	540	52	Apr-Sep	-
So. Fk. Flathead nr Columbia Falls, Montana 40/	1,500	63	Apr-Sep	2,489
Flathead at Columbia Falls, Montana 40/	4,000	62	Apr-Sep	6,785
near Polson, Montana 40/	4,400	58	Apr-Sep	8,187
Clark Fork above Missoula, Montana	900	49	Apr-Sep	2,649
near Plains, Montana 40/	6,700	53	Apr-Sep	14,454
at Whitehorse Rapids, Idaho	7,400	53	Apr-Sep	-
Bitterroot near Darby, Montana	280	48	Apr-Sep	836
Priest near Priest River, Idaho	-	-	-	-
Pend Oreille below Box Canyon, Washington	8,000	50	Apr-Sep	17,638
Kettle near Laurier, Washington	1,220	65	Apr-Sep	-
Spokane at Post Falls, Idaho	1,200	40	Apr-Sep	-
Similkameen near Nighthawk, Washington	910	60	Apr-Sep	1,967
Okanogan near Tonasket, Washington	1,070	62	Apr-Sep	2,135
Methow near Pateros, Washington	450	44	Apr-Sep	-
Stehekin at Stehekin, Washington	490	54	Apr-Sep	-
Chelan at Chelan, Washington 43/	650	52	Apr-Sep	1,467
Wenatchee at Peshastin, Washington	900	50	Apr-Sep	2,134
SNAKE				
Snake above Palisades Res., Wyoming 44/	1,280	49	Apr-Sep	3,237
near Heise, Idaho 45/	2,050	52	Apr-Sep	-
near Blackfoot 46/	-	-	-	-
at Weiser, Idaho	-	-	-	-
Grey's above Palisade, Wyoming	150	39	Apr-Sep	477
Salt above Palisade, Wyoming	105	29	Apr-Sep	516
Henry's Fork near Ashton, Wyoming 47/	-	-	-	-
Teton near St. Anthony, Idaho	-	-	-	-
Blackfoot Reservoir Inflow, Idaho	-	-	-	-
Big Lost near Mackay, Idaho 48/	45	25	Apr-Sep	-
Portneuf at Topaz, Idaho	-	-	-	-
Salmon Falls Creek nr San Jacinto, Idaho	-	-	-	-
Big Wood, Inflow to Magic Res., Idaho 49/	80	25	Apr-Sep	-
Bruneau near Hot Springs, Idaho	-	-	-	-
Boise near Boise, Idaho 50/	400	25	Apr-Sep	-
Owyhee near Owyhee, Nevada 51/	15	22	Apr-July	85
Owyhee Res. Net Inflow, Oregon 27/	110	22	Feb-July	680
Malheur near Drewsey, Oregon	14	13	Feb-July	-
Payette near Horseshoe Bend, Idaho 52/	700	38	Apr-Sep	-
Weiser above Crane Creek, Idaho 40/	-	-	-	-
Burnt near Hereford, Oregon 40/	12	25	Feb-July	-
Powder near Sumpter, Oregon	20	36	Apr-July	-
Eagle above Skull Creek, Oregon	67	38	Apr-July	-
Imnaha at Imaha, Oregon	150	49	Apr-Sep	-
Salmon at Whitebird, Idaho	3,100	45	Apr-Sep	-
Lostine near Lostine, Oregon	79	63	Apr-Sep	-
Grand Ronde at LaGrande, Oregon	59	38	Apr-Sep	246
Clearwater at Spalding, Idaho	4,100	48	Apr-Sep	-
LOWER COLUMBIA				
Yakima at CleElum, Washington 53/	490	51	Apr-Sep	-
near Parker, Washington 54/	640	37	Apr-Sep	-
Naches near Naches, Washington 55/	365	41	Apr-Sep	-
Walla Walla, So.Fk. near Milton, Oregon	60	76	Mar-Sep	-

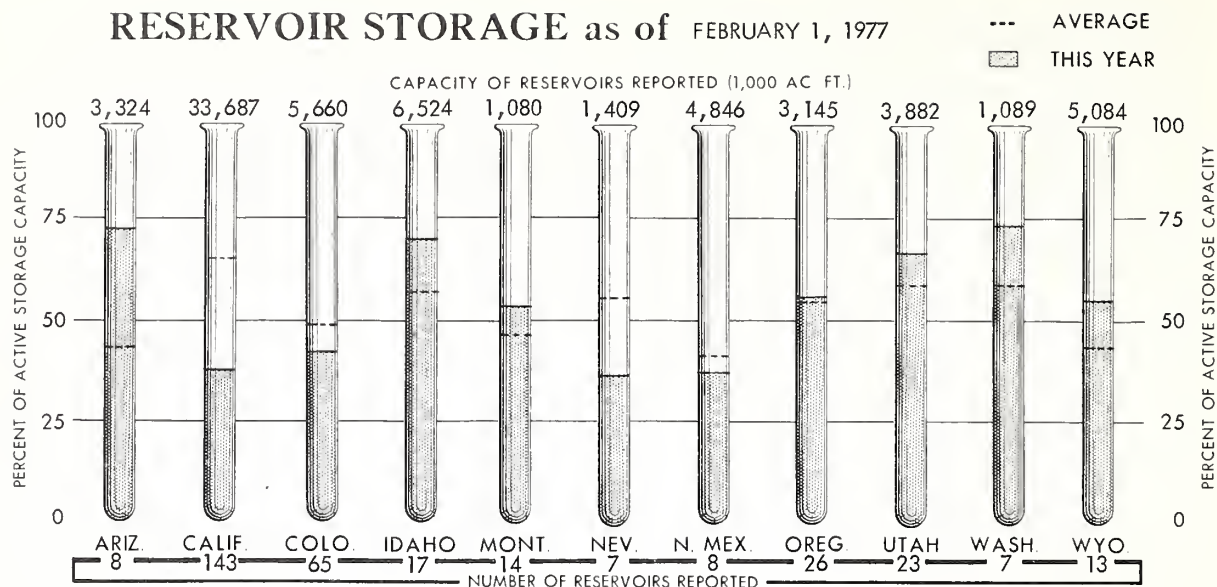
Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
Explanatory Notes on Forecasts listed on Inside Back Cover.

SELECTED STREAMFLOW FORECASTS FEBRUARY 1, 1977

STREAM AND STATION	FORECASTS THIS YEAR		Forecast Period	Last Year's Flow In (1,000 A. F.)
	Flow In (1,000 A. F.)	Percent of Average		
LOWER COLUMBIA (continued)				
Umatilla at Pendleton, Oregon	80	40	Mar-Sep	-
John Day, Middle Fork at Ritter, Oregon	52	40	Mar-July	-
North Fork at Monument, Oregon	260	40	Mar-July	-
Crooked near Post, Oregon	25	14	Feb-July	-
Deschutes at Benham Falls, Oregon 40/	258	72	Apr-July	-
Columbia at The Dalles, Oregon 40/	58,500	56	Apr-Sep	122,876
at The Dalles, Oregon 40/	49,800	55	Apr-July	99,965
Hood near Tucker Bridge, Oregon 40/	193	58	Apr-Sep	-
McKenzie near Vida, Oregon	843	67	Apr-Sep	-
Santiam, South, at Waterloo, Oregon	300	48	Apr-Sep	-
North, at Mehama, Oregon 40/	470	54	Apr-Sep	-
Clackamas at Estacada, Oregon	470	60	Apr-Sep	-
Willamette at Salem, Oregon 40/	2,900	59	Apr-Sep	-
Lewis at Ariel, Washington 56/	775	58	Apr-Sep	1,333
Cowlitz at Castle Rock, Washington 57/	1,660	60	Apr-Sep	3,030
NORTH PACIFIC COASTAL				
Dungness near Sequim, Washington	90	55	Apr-Sep	-
Umpqua, No., near Toketee Falls, Oregon 40/	115	72	Apr-Sep	-
Rogue at Raygold, Oregon	490	55	Apr-Sep	997
Klamath Lake, Net Inflow, Oregon	240	45	Feb-Sep	499
Trinity at Lewiston, California	315	51	Apr-July	370
CALIFORNIA CENTRAL VALLEY 40/				
Sacramento, Inflow to Shasta, California	1,100	62	Apr-July	1,135
Feather near Oroville, California	830	45	Apr-July	565
Yuba at Smartville, California	270	25	Apr-July	279
American, Inflow to Folsom Res., California	310	23	Apr-July	312
Cosumnes at Michigan Bar, California	35	27	Apr-July	15
Mokelumne, Inflow to Pardee Res., California	150	32	Apr-July	122
Stanislaus, Inflow to Melones Res., California	275	38	Apr-July	199
Tuolumne, Inflow to Don Pedro Res., California	470	39	Apr-July	330
Merced, Inflow to Exchequer Res., California	225	37	Apr-July	168
San Joaquin, Inflow to Millerton Lake, Calif.	470	39	Apr-July	350
Kings, Inflow to Pine Flat Res., California	465	40	Apr-July	303
Kaweah, Inflow to Terminus Res., California	115	43	Apr-July	75
Tule, Inflow to Success Res., California	14	24	Apr-July	13
Kern, Inflow to Isabella Res., California	125	30	Apr-July	104
ALASKA				
Yukon at Eagle, Alaska	-	-	Apr-July	-
at Ruby, Alaska	-	-	Apr-July	-
Porcupine near Ft. Yukon, Alaska	-	-	Apr-July	-
Salcha near Salchaket, Alaska	-	-	Apr-July	-
Little Chena near Fairbanks, Alaska	-	-	Apr-July	-
Ship Creek near Anchorage, Alaska	-	-	Apr-July	-
So. Fk. Campbell Creek near Anchorage, Alaska	-	-	Apr-July	-

Forecasts in California provided by Department of Water Resources.
Average is for 1958-72 period except California. California is computed for 1921-70 period.
Forecasts assume average Effective Climate Conditions from Date Through Snow Melt Season.
Explanatory Notes on Forecasts listed on Inside Back Cover.

RESERVOIR STORAGE as of FEBRUARY 1, 1977



IDAHO

The water supply outlook for Idaho is projected to be extremely low for the 1977 runoff season. Selected forecasts of seasonal runoff vary from a low of 12% of normal for the Bear River at Harer to a high of 60% of average for the Kootenai at Leonia. Many of the forecasts represent minimum of record flows.

Snowpack accumulation as of February 1, 1977, was at an all time low, even on courses of over 40 years of record. Snow cover varies from a low of 6% of average on the Raft River watershed to a high of 41% of normal on the Kootenai drainage. In general, approximately 70% of the total winter snowfall is accumulated by February 1. Even with extremely heavy snowfall and rain during the remainder of the season, there is only a very remote chance of attaining an average runoff situation for the coming season.

The winter of 1976-77 continues to be one of the driest on record with October-January precipitation ranging from 10 to 40% of normal over the entire state. Soil moisture is poor throughout Idaho.

As of the end of January, streamflow had dropped well below normal on nearly all streams in the state. The smaller streams are especially low at this time.

Stored water in the irrigation reservoirs as of February 1 was 132% of normal for the Upper Snake, 131% on southern tributaries, 73% on the Lost and Wood drainages and 103% on the Boise and Payette River systems.

Low snowpack, dry soils, low flows, and low carryover reservoir storage portends an extremely low runoff during 1977.

It is apparent critical irrigation shortages will be experienced on small streams and those without storage facilities, and shortages may be felt even on systems normally having adequate storage.

MONTANA

Except for the northern end of the Bighorn Mountains and some small mountain ranges in central Montana the mountain snowpack is poor. Snow deposition during January continued the below average trend of recent months. In general, the amount of water stored on the mountain watersheds as snow is 20 to 60 percent of average. Most deficient areas are the Kootenai, Lower Clark Fork and Bitterroot River drainage west of the divide and Beaverhead, Bighole and Upper Yellowstone drainages east of the divide. Forecasts west of the divide are for streamflows only slightly higher than the low years of 1940 and 1941 east of the divide in southern Montana, streamflow forecasts are similar to flows that occurred in the low years of 1960, 1961, and 1966. In the more northern drainages, low flows of the late 1930's and early 1940's are expected.

With the lack of high elevation snow, streams are expected to drop rapidly after the main snow melt period.

Most Columbia Basin streams are forecast to produce flows only slightly higher than the low runoffs of records set in 1940 and 1941, and may be similar to more recent low flow years of 1966 and 1973. Most streams are expected to produce about one-half their average streamflow during the April through September period.

In the area above Canyon Ferry Reservoir on the Missouri, runoff could be a little above the low years of 1961 and 1966. In the Sun, Marias, and St. Mary's rivers, area flows will probably be like those in the early 1940's. Streamflow from the Big and Little Belt Mountains is forecast a little higher on a percentage, however, still below average.

Forecasts of runoff are near record low volumes on most streams in the Yellowstone Basin. Runoff comparable to 1941, 1961, and 1966 is expected. In contrast to the low year on most streams the

STORAGE IN LARGE RESERVOIRS

FEBRUARY 1, 1977

BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE	BASIN AND NAME OF RESERVOIR	CAPACITY (1,000 A.F.)	STORAGE (1,000 A.F.)	STORAGE PERCENT AVERAGE
UPPER MISSOURI				UPPER COLUMBIA			
Belle Fourche	185	58	65	Chelan	676	258	87
Boysen	550	314	109	Coeur d'Alene	225	22	16
Buffalo Bill	373	170	103	Duncan	1,400	504	130
Canyon Ferry	2,043	1,773	108	Flathead	1,791	898	72
Fort Peck	19,140	16,260	123	Hungry Horse	3,428	2,428	98
Garrison	24,790	18,292	127	Kootenay	787	505	79
Hebgen	377	222	110	Lake Koocanusa	5,694	3,153	-
Keyhole	192	123	172	Lower Arrow	2,691	831	246
Lake Francis Case	5,816	2,297	103	Noxon Rapids	335	269	84
Lake Sharpe	1,900	1,781	104	Pend Oreille	1,155	233	53
Oahe	23,630	18,349	124	Roosevelt	5,232	4,172	110
Tiber	1,347	450	86	Upper Arrow	4,400	1,107	173
Bighorn Lake	1,356	906	114				
PLATTE				LOWER COLUMBIA			
So. Platte in CO (30)	1,085	667	92	Cougar	155	0	0
City of Denver (7)	622	442	95	Detroit	300	0	0
Colo-Big Thompson (3)	718	351	84	Green Peter	270	0	0
Glendo	784	313	100	Hills Creek	200	0	0
Pathfinder	1,016	765	224	Lookout Point	337	0	0
Seminole	1,010	498	127	Prineville	153	93	91
				Wickiup	200	171	115
ARKANSAS				Yakima Res. (5)	1,066	772	124
Conchas	273	83	45				
John Martin	354	12	14	SNAKE			
Turquoise	130	32	-	American Falls	1,125	980	157
Pueblo	354	56	-	Anderson Ranch	423	330	128
				Arrowrock	287	197	82
RIO GRANDE				Brownlee	980	670	90
Elephant Butte	2,195	318	72	Cascade	653	366	107
New Mexico Res. (4)	571	250	352	Dworshak	2,016	890	174
				Jackson	847	586	108
UPPER COLORADO				Lucky Peak	278	54	58
Blue Mesa	830	416	-	Owyhee	715	487	119
Flaming Gorge	3,749	3,017	184	Palisades	1,200	1,026	131
Navajo	1,696	1,145	95	Warm Springs	191	78	97
Powell	25,002	18,018	214				
Starvation	152	145	-	PACIFIC COASTAL			
				Clair Engle	2,448	1,159	57
LOWER COLORADO				Clear Lake	440	210	102
Havasu	619	543	100	Nacimiento	350	44	24
Mead	26,159	21,988	127	Ross	1,053	770	132
Mohave	1,810	1,676	100	Upper Klamath	584	329	91
Salt River Res. (4)	1,755	941	87				
San Carlos	949	8	47	CALIFORNIA			
Verde River Res. (2)	318	54	43	CENTRAL VALLEY			
				Almanor	1,308	600	81
GREAT BASIN				Berryessa	1,602	997	65
Bear	1,421	1,031	109	Bullards Bar	961	270	54
Lahontan	291	150	82	Folsom	1,010	292	49
Rye Patch	157	104	121	Isabella	570	67	34
Sevier Bridge	236	106	128	McClure	1,026	213	36
Strawberry	274	205	180	Millerton	521	252	65
Tahoe	732	165	39	Oroville	3,538	1,606	67
Utah	884	722	128	Pine Flat	1,002	266	44
Willard Bay	193	140	127	Shasta	4,552	1,533	45

Reservoir Storage Data Provided by Bureau of Reclamation, Corps of Engineers, Geological Survey and water using organizations. Data from California and British Columbia provided by Department of Water Resources and Department of Lands, Forests and Water Resources, respectively.

Little Bighorn River is forecast to have near average runoff due to the better snowpack in this locality. Late season water shortages are anticipated for most headwater streams not having stored water.

Irrigation demand will exceed July and August streamflow on most streams not having stored water except in the Yellowstone. Farmers, ranchers and other water users should begin to evaluate their prospective water supply and begin to initiate alternatives that can reduce the impact of a low runoff year.

NEVADA

February 1 snow course measurements continue to indicate a minimal snowpack throughout Nevada and the Sierras. Measurements are similar to last year's in the Sierras. Last year the Upper Humboldt and Owyhee Rivers had average to above normal snowpack on February 1.

The Tahoe and Truckee Basin snow courses indicate water contents at 23 percent of average while the Carson and Walker Basins are 20 percent. Other basins in the state and their snowpack percentages are: Owyhee 16 percent; Upper Humboldt 17 percent; Snake 15 percent; Northern Great Basin 30 percent; Eastern Nevada 40 percent and Central Great Basin 50 percent.

Reservoir storage is below average on the Sierra streams. Lake Tahoe's elevation is now 6,224.36 feet, containing 165,000 acre-feet as compared to last year's 499,000 and an average of 426,000 acre-feet. Under present conditions Lake Tahoe will probably drop to the 6,233.0 feet elevation in June. This is the first time the water level has dropped to the rim since October 25, 1961. Stampede Reservoir contains 42,000 acre-feet as compared to last year's 147,000 acre-feet. Boca Reservoir has 24,000 acre-feet compared to 28,000 acre-feet last year. Prosser is empty.

Lahontan Reservoir contains 150,000 acre-feet. This compares to the average of 182,000 acre-feet and last year's 205,000 acre-feet.

Rye Patch Reservoir on the Humboldt River contains 104,000 acre-feet for 121 percent of average storage but is below last year's 154,000 acre-feet. Wild Horse Reservoir has 44,000 acre-feet as compared to last year's 55,000 acre-feet.

Lake Mead shows 21,988,000 acre-feet or 109 percent of last year's and some 4,667,000 acre-feet more than the 1958-72 average.

With the present conditions, water shortages will occur in all parts of the state except the few areas with adequate reservoir storage.

NEW MEXICO

The snowpack on the Rio Grande Basin in New Mexico is a surprising 75% of normal. Several

storms dropped varying amounts of snow on the Sangre de Cristo Range, which improved the pack, and as of February 1 some snow courses in this area are above normal.

The San Juan Range on the west side of the Rio Grande hasn't been so fortunate. Many of these snow courses are only half of the 15-year average. However, the Rio Grande Basin in Colorado has an extremely poor snowpack. Many courses are at a minimum of record.

Precipitation this winter continues to be considerably below normal with seasonal October through January precipitation generally less than 70% of normal, in many areas less than 50% of normal.

Precipitation during January brought some relief to the drought-stricken area. Although at Santa Fe precipitation was only 36% of normal, most other areas were well above normal.

Streamflow this summer is expected to be between 50 and 60% of normal. Forecasts are based on normal precipitation for the remainder of the year. New Mexico could have two more months of snow, and forecasts can be revised significantly if the weather pattern changes.

Carryover reservoir storage is about 85% of normal for New Mexico. Elephant Butte contains 318,000 acre feet with a normal of 442,000 acre feet. Caballo contains 133,000 acre feet with a normal of only 50,000 acre feet.

Soil moisture is reported as good in the Albuquerque and Las Cruces area and fair to poor in other irrigated areas.

OREGON

The water supply outlook for Oregon ranges from very poor to near average. The mountain snowpack is generally at record low levels. New record lows were established at seventy-one snow courses. Snow cover varies from 1 to 20% in the Cascades and from 10 to 35% in Eastern Oregon. It would require snow falls in excess of 300% for the next two months to recover to a normal snowpack.

It has been extremely dry in Oregon since September. During January precipitation varied from 15% of average in the Willamette Valley to 35% in Malheur County in Eastern Oregon. Soils are dry beneath the mountain snowpack. A significant amount of snowmelt will be lost to the soil during runoff.

Stored water supplies are generally near average for this time of year. However, some reservoirs will not fill because of the expected low streamflow. Twenty-six major irrigation reservoirs are currently storing 1,800,000 acre feet of water compared to a normal of 1,779,000.

Streams are still flowing at the base levels of last September. There has been no contribution to runoff from what little rainfall has been received to date. Streamflow is expected to be much below normal this next spring and summer. The

Malheur is forecast to yield only 13 percent of its average, while the Owyhee is expected to flow at 21% of normal. The middle fork of the Willamette is forecast at 49 percent, the spring-fed Deschutes is expected to discharge 76 percent of its average.

UTAH

Utah's water supply outlook is poor for those areas without adequate reservoir storage.

Snow surveys taken the last week of January show only two-thirds as much water content as the previous record low snowpack in 1961. Snow cover ranges from 11% of the February 1 average in Uinta Basin streams to 39% of average on the Beaver River.

An average of 51 snow courses scattered over the state indicates there is only 16% of the April 1 average on the ground. In a normal year 65% of the April 1 amount would have accumulated by this date.

January precipitation at mountain stations ranged from 11 to 96% of the 15 year average. The total October-January catch, however, has been very low and ranged from 15 to 52% of average.

Watershed soils are very dry as a result of low fall and winter moisture. This dry soil condition is expected to further reduce spring runoff.

Storage in 23 of Utah's reservoirs is 115% of the February 1 average, but 15% less than last year at this time. Areas which have below average storage are Uinta Basin, Moon Lake 37% of average, and Steinaker 80% of average. Woodruff Narrows was estimated at about 7%, Causey 61%, and Deer Creek Reservoir 92% of the February 1 average. Minersville Reservoir is 65% of average, Piute is 63%, and Gunnison is only 14% of average. Other small reservoirs are reported as very low.

Streamflow forecasts, for the spring and summer period, range from a low 5% of average for the Duchesne at Randlett, to a high of 65% of average on Ephraim Creek. Most forecasts are near previous record low years of 1934 and 1961.

The Bear River is forecast to flow only 8% of average. Inflow to Pineview Reservoir is expected to be 18%. Streams along the Salt Lake front range from 12% on Parleys Creek to 51% on Little Cottonwood Creek. The Sevier River is forecast to yield 33% of average at Gunnison. The Green will flow at about 35% of normal while the Colorado will discharge into Lake Powell at a 42% of normal rate.

WASHINGTON

The water supply outlook for Washington is expected to be very poor this coming summer. Measurements of snow cover in the state and tributary areas indicate that the snowpack is

at a record low as of February 1. Precipitation has also been very low since August. The dry fall, coupled with the low snowpacks, has resulted in extremely dry soils which will have the tendency to reduce runoff even further. The one bright spot in the whole water supply picture is the fact that reservoirs have more water in storage as of February 1 than normal.

Statewide, the snowpack is the lowest measured in the history of the snow survey program. The Yakima drainage has a current snowpack that is only 4 percent or normal. In the Upper Columbia Basin the snowpack ranges up to a high of 43 percent of normal on the Kettle River. On the Lower Columbia Drainage, the snowpack ranges from no snow at the one snow course on the Klickitat Drainage to 19 percent of normal for the Mill Creek Watershed in the Blue Mountains. Streams draining into Puget Sound range from 2% to 25% of normal. The two Olympic Peninsula snow courses were bare.

Only four reservoirs in the state have below normal storage as of February 1. Storage in the remaining reservoirs ranges up to 164% of normal. It is expected that these reservoirs will provide adequate deliveries to water users.

United States Geological Survey streamflow measurements indicate that January flows ranged from a low of 16 percent of normal for the Palouse River to a high of 87 percent of normal for the Columbia at Birchbank. Streamflow forecasts for the April-September period range from a low of 31 percent of normal for the Ahtanum Creek to a high of 73 percent for the Columbia River at Birchbank. The forecast for the Columbia at The Dalles is 58,500,000 acre feet, or 56 percent of normal for the April-September period. The record low for this station occurred in 1926, when 56,600,000 acre feet of water flowed by the station.

WYOMING

Poor water supplies are forecast for the spring and summer months throughout most of Wyoming. A record low snowpack exists in the western and southern portions of the state with only the northeast corner reporting measurements equal to or above the February 1 average.

The winter storms have bypassed most of the state crossing only the northeast corner. The snowpack in the Black Hills is 134 percent of the February 1 average and the Bighorn Mountains range from near normal at the northern end to less than half of normal at the southern end. Most of the snow course measurements in the remainder of the state are the lowest on record--with some of the snow courses dating back to 1919.

Due to low fall precipitation, most mountain soils remain very dry. As the snowmelt begins, the soils will absorb a large portion of the water which will detract from the runoff.

The Tongue River near Dayton is forecast near average for the April-September period. The remainder of the streams are forecast to be less than 80 percent of the normal amount and many

are less than 60 percent. The low in the state is Thomas Fork on the west side at only 19 percent of average. The streamflow forecasts are based on current snowpack conditions and assume that normal amounts of precipitation will occur the remainder of the season. If the current dry spell continues, streamflow volumes may be substantially lower.

The reservoir storage is the one bright spot in the water supply picture. With the exception of Bull Lake and Pilot Butte reservoirs in the Wind River Basin, carryover storage in all major reservoirs is above the February 1 average. Storage in the North Platte system is currently $1\frac{1}{2}$ times the normal amount.



EXPLANATION of STREAMFLOW FORECASTS

All flows are observed flows except as adjusted for: 1/ Storage change in Lake Sherburne. 2/ Storage change in Lima and Clark Canyon reservoirs. 3/ Storage change in Hebgen Lake. 4/ Storage change in Gibson Reservoir and measured diversions. 5/ Storage change in Two Medicine, Four Horns, Lake Francis and Swift reservoirs. 6/ Storage change in Canyon Ferry and Tiber reservoirs. 7/ Changes as indicated in (6/), (8/), plus storage change in Fort Peck. 8/ Storage change in Boysen, Buffalo Bill, Bull Lake and Yellowtail reservoirs. 9/ Storage change in Buffalo Bill Reservoir plus Heart Mountain diversion. 10/ Storage change in Pilot Butte and Bull Lake reservoirs plus Wyoming canal diversion.

11/ Changes indicated in (10/) plus storage change in Boysen Reservoir. 12/ Plus diversions to Cache LaPoudre. 13/ Plus by-pass to power plants. 14/ Minus diversion thru Gumlick Tunnel. 15/ Storage change in Price Reservoir. 16/ Minus diversions from North Platte, Laramie and Colorado rivers plus measured diversions above station. 17/ Storage change in Clear Creek, Twin Lakes and Turquoise reservoirs minus diversions from Colorado River. 18/ Storage change in Rio Grande, Santa Maria and Continental reservoirs. 19/ Storage change in El Vado and Abiquiu reservoirs. 20/ Storage change in Platoro Reservoir.

21/ Storage change in Grandby Reservoir as furnished by U.S.B.R. plus diversions by Adams Tunnel and Grand River Ditch. 22/ Changes as indicated in (21/) plus diversions thru Roberts, Gumlick and Moffat tunnels and storage change in Dillon, Homestake, Williams Fork, Green Mountain and Willow Creek reservoirs. 23/ Changes indicated in (22/) and (26/). 24/ Storage change in Blue Mesa Reservoir. 25/ Changes indicated in (24/), (30/) and (35/) and storage change in Lake Powell. 26/ Diversions to Arkansas River plus storage change in Ruedi Reservoir. 27/ (Inflow record as computed by U. S. Bureau of Reclamation.) 28/ Storage change in Taylor, Blue Mesa and Morrow Point reservoirs. 29/ Storage change in Fontenelle Reservoir. 30/ Storage change in Flaming Gorge Reservoir.

31/ Plus diversion through Duchesne Tunnel. 32/ Storage change in Moon Lake Reservoir. 33/ Storage change in Scofield Reservoir. 34/ Storage change in Joe's Valley Reservoir. 35/ Storage change in Navajo Reservoir. 36/ Plus U. P. & L. Co. tailrace and Logan, Hyde Park and Smithfield canals. 37/ Minus diversions thru Duchesne Tunnel and Weber-Provo Canal. 38/ Storage change in Lake Tahoe and Boca reservoirs (Forecast by Truckee Basin Committee.) 39/ Storage change in Bridgeport Reservoir. 40/ Corrected for major upstream impairments -- represents simulated natural flow conditions.

41/ Storage change in Priest Lake. 42/ Storage change in Coeur d'Alene Lake and diversions by Spokane Valley Farms Co. and Rathrum Prairie canals. 43/ Storage change in Lake Chelan. 44/ Storage change in Jackson Lake. 45/ Storage change in Jackson Lake and Palisade reservoirs. 46/ Storage change in Jackson Lake, Palisades, Island Park, Henry's Lake, Grassy Lake plus diversions between Heise and Blackfoot. 47/ Storage change in Henry's Lake and Island Park reservoirs. 48/ Storage change in MacKay Reservoir and diversion in Sharp Ditch. 49/ Combined flow Big Wood near Bellevue and Camas Creek near Blaine. 50/ Storage change in Arrowrock, Anderson Ranch and Lucky Peak reservoirs.

51/ Storage change in Wild Horse Reservoir. 52/ Storage change in Cascade and Deadwood reservoirs. 53/ Storage change in Keechelus, Kachess and CleElum reservoirs plus diversion by Kittitas Canal. 54/ Changes indicated in (52/) plus storage change in Bumping and Rimrock Lakes plus diversion by Roza, Union Gao, New Reservation, Old Reservation and Sunrise canals. 55/ Storage change in Bumping and Rimrock lakes and diversions by Tieton, Selah Valley, Wapatox canals and City of Yakima. 56/ Storage change in Merwin, Yale and Swift reservoirs. 57/ Storage change in Mayfield Reservoir.

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